

REMARKS

At the outset, the Examiner is thanked for the thorough review and consideration of the pending application. The Office Action dated June 30, 2009 has been received and its contents carefully reviewed.

Claims 29, 30, 36, 39-42, 46, 47, 49, 52, 57, 58, 65, 67-69, 73, and 74 are hereby amended. Claims 31-33, 35, 48, 50, and 51 are canceled without prejudice or disclaimer. New claim 76 is added. No new matter has been added. Seven claims are canceled and one claim is added. No claim fee is due with this Amendment. Accordingly, claims 29, 30, 34, 36-47, 49, and 52-76 are currently pending. Reexamination and reconsideration of the pending claims are respectfully requested.

The Office Action objects to claims 36, 39, 41, 42, 46, 47, 50, and 72 for minor informalities. Applicants have amended claims 36, 39, 41, 42, 46, and 47 to correct the minor informalities. Claim 50 is canceled. Regarding claim 72, there are two claims 72, and the second claim 72 should be claim 74. Applicants have corrected typographic error in the second claim 72. Applicants, therefore, respectfully request withdrawal of the objection to claims 36, 39, 41, 42, 46, 47, 50, and 72.

The Office Action objects to claim 31 as of being of improper dependent form. Claim 31 is canceled. Applicants, therefore, respectfully request withdrawal of the objection to claim 31.

The Office Action rejects claims 30, 35, 36, 39-42, 46, 47, 51, 52, 58, 67, 69, and 73 under 35 U.S.C. §112, second paragraph, as being indefinite. Claims 35 and 51 are canceled. Applicants have amended claims 30, 36, 39-42, 46, 47, 52, 58, 67, 69, and 73 to more clearly define claimed subject matter. Applicants, therefore, respectfully request withdrawal of the 35 U.S.C. §112, second paragraph, rejection of claims 30, 35, 36, 39-42, 46, 47, 51, 52, 58, 67, 69, and 73.

The Office Action rejects claims 29-54, 56-59, 62, 65, 66, 69-71, and 75 under 35 U.S.C. §102(a) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as

being obvious over Franger et al., Journal of Power Sources, 119-121 (2003) 252-257 (Franger). Applicants respectfully traverse the rejection.

Franger was published in 2003, so the earliest possible publication date is January 1, 2003. The present application is a national phase application of PCT Application No. PCT/FR2003/050172, which claims the benefit of French Patent Application No. 02 15915, filed December 16, 2002. Applicants submit a certified English translation of French Patent Application No. 02 15915 with this paper to perfect claim for priority. Because the priority date of the present application, December 16, 2002, is earlier than the publication date of *Franger*, *Franger* does not constitute prior art against the present application under 35 U.S.C. §§102(a), 103(a). Applicants, therefore, respectfully request withdrawal of the rejection of claims 29-54, 56-59, 62, 65, 66, 69-71, and 75.

The Office Action rejects claims 47-54, 56, 65, 66, 69-71, and 75 under 35 U.S.C. §102(b) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being obvious over Bridson et al., Chem. Mater. 1998, 10, pp. 763-768 (Bridson). Claims 48, 50, and 51 are canceled, so the rejection of these claims is moot. Applicants respectfully traverse the rejection of claims 47, 49, 52-54, 56, 65, 66, 69-71, and 75.

Claim 47 recites, “an insertion compound of an alkali metal of formula LiM(XO₄) where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and M is a transition metal in a +2 oxidation state.” *Bridson* fails to teach or suggest at least this element of claim 47. Instead, *Bridson* discloses “hydrothermal methods for the synthesis of maricite [NaFePO₄] and SIHP [sodium iron hydroxyphosphate] and crystal structures of both compounds.” *Bridson*, page 764, first column, lines 19-21. *Bridson* is silent with respect to lithium comopunds. In addition, claim 47 also recites, “a deviation from the mean value of the size of the particles is less than 20%.” *Bridson* also fails to teach or suggest at least this element of claim 47. The Office Action states “in the absence of a teaching of deviation from the mean value of particle size, the deviation would be expected to be 0%.” *Office Action*, page 12. The Office fails to provide any support for this assertion. On the contrary, most of the processes lead to compounds in which the deviation from the mean value of the size of the particles is high. Accordingly, claim 47 is allowable over *Bridson*. Claims 49, 52-54, 56, 65, and 66 variously depend from claim 47, and are also allowable for at least the same reasons as claim 47.

Claims 69-71 and 75 variously depend from claim 29, and incorporate all the elements of claim 29. The Office Action does not reject independent claim 29, so claims 69-71 and 75 are allowable over *Bridson* for at least the same reasons as claim 29. Nevertheless, claim 29 recites, “an organic complex of a transition metal or of a mixture of transition metals M in an oxidation state of greater than 2 is brought into contact with Li₂HPO₄ and with an entity of formula H_b(XO₄), where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and b has a value from 0 to 5, in a liquid medium in a closed chamber.” *Bridson* fails to teach or suggest at least this element of claim 29. As discussed, *Bridson* only discloses sodium compounds and is silent with respect to lithium compounds. Accordingly, claims 29 and its dependent claims 69-71 and 75 are allowable over *Bridson*.

Applicants, therefore, respectfully request withdrawal of the rejection of claims 47-54, 56, 65, 66, 69-71, and 75.

The Office Action rejects claims 29-34, 39, 47, 52-54, 57, 58, and 69-71 under 35 U.S.C. §102(e) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being obvious over U.S. Patent Application Publication No. 2002/0192553 to Barker et al. (*Barker*). Claims 31-33 are canceled, so the rejection of these claims is moot. Applicants respectfully traverse the rejection of claims 29, 30, 34, 39, 47, 52-54, 57, 58, and 69-71.

Claim 29 recites, “a process for the preparation of an insertion compound of an alkali metal ... the insertion compound of an alkali metal of formula LiMXO₄, in which M is in the +2 oxidation state.” *Barker* fails to teach or suggest at least these elements of claim 29. *Barker* discloses “compounds of general formula: AaMb(XY4)cXZd, wherein (a) A is selected from the group consisting of sodium and mixtures of sodium with other alkali metal.” *Barker*, ¶¶0007-0009. *Barker* is silent with respect to lithium compounds. Moreover, the process of claim 29 provides superior and unexpected results. See, *Specification*, page 8, line 9, to page 10, line 16. Accordingly, claims 29 and its dependent claims 30, 34, 39, 57, 58, and 69-71 are allowable over *Barker*.

Claim 47 recites, “an insertion compound of an alkali metal of formula LiM(XO₄) where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and M is a transition metal in a +2 oxidation state.” *Barker* fails to teach or suggest at least this element of

claim 47. As discussed, *Barker* is silent with respect to lithium compounds. In addition, the present application provides that “[t]he compound according to the invention has a content of metal M at an oxidation state of greater than 2(II), which is an impurity, for example a content of metal M(III), such as Fe(III), of less than 5% by weight, preferably of less than 1%. This high purity is fundamentally related to the specific characteristics of the process according to the invention” *Specification*, page 17, lines 4-12. It is evident that the present invention produces unexpected results—high purity compound. Further, because *Barker* only discloses sodium compounds and chemical art is unpredictable, one of ordinary skill in the art would not have been motivated to replace sodium compounds with lithium compounds.

Claim 47 also recites, “the particles exhibit a fully controlled homogeneous morphology, and a deviation from the mean value of the size of the particles is less than 20%.” *Barker* also fails to teach or suggest at least these elements of claim 47. *Barker* is silent with respect to particles and the size of the particles. Accordingly, claims 47 and its dependent claims 52-54 are allowable over *Barker*.

Applicants, therefore, respectfully request withdrawal of the rejection of claims 29-34, 39, 47, 52-54, 57, 58, and 69-71.

The Office Action rejects claims 47, 52-56 and 67-75 under 35 U.S.C. §102(e) as being anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being obvious over U.S. Patent Application Publication No. 2004/0048157 to Neudecker et al. (*Neudecker*). Applicants respectfully traverse the rejection.

Claims 69-75 variously depend from claim 29, and incorporate all the elements of claim 29. The Office Action does not reject independent claim 29, so claims 69-71 and 75 are allowable over *Neudecker* for at least the same reasons as claim 29. Nevertheless, claim 29 recites, “a process for the preparation of an insertion compound of an alkali metal ... the insertion compound of an alkali metal of formula Li_xMXO₄, in which M is in the +2 oxidation state.” *Neudecker* fails to teach or suggest at least these elements of claim 29. *Neudecker* only discloses “a battery that may include a lithium vanadium oxide Li_xV₂O_y ... positive cathode or negative anode.” *Neudecker*, ¶0002. While *Neudecker* discloses “the cathode layer may, for example, include .. LiFePO₄,” *Neudecker*, ¶0059, *Neudecker* does not teach or suggest the

process of preparing LiFePO₄. Accordingly, claims 29 and its dependent claims 69-75 are allowable over *Neudecker*.

Claim 47 recites, “an insertion compound of an alkali metal of formula LiM(XO₄) where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and M is a transition metal in a +2 oxidation state, wherein the insertion compound is present in the form of particles or grains, the particles exhibit a fully controlled homogeneous morphology, and a deviation from the mean value of the size of the particles is less than 20%.” *Neudecker* fails to teach or suggest at least this element of claim 47. As discussed, *Neudecker* only discloses “the cathode layer may, for example, include .. LiFePO₄,” *Neudecker*, ¶0059, and *Neudecker* does not teach or suggest the process of preparing LiFePO₄ and is silent with respect to “form of particles or grain” and “deviation.” In addition, the present application provides that “[t]he compound according to the invention has a content of metal M at an oxidation state of greater than 2(II), which is an impurity, for example a content of metal M(III), such as Fe(III), of less than 5% by weight, preferably of less than 1%. This high purity is fundamentally related to the specific characteristics of the process according to the invention” *Specification*, page 17, lines 4-12. It is evident that the present invention produces unexpected results—high purity compound. Accordingly, claims 47 and its dependent claims 52-56, 67, and 68 are allowable over *Neudecker*.

Applicants, therefore, respectfully request withdrawal of the rejection of claims 47, 52-56 and 67-75.

The Office Action rejects claims 29-34, 36-46, and 57-64 under 35 U.S.C. §103(a) as being obvious over *Bridson*. Claims 31-33 are canceled, so the rejection of these claims is moot. Applicants respectfully traverse the rejection of claims 29, 30, 34, 36-46, and 57-64.

Claim 29 recites, “an organic complex of a transition metal or of a mixture of transition metals M in an oxidation state of greater than 2 is brought into contact with Li₂HPO₄ and with an entity of formula H_b(XO₄), where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and b has a value from 0 to 5, in a liquid medium in a closed chamber.” *Bridson* fails to teach or suggest at least this element of claim 29. As discussed, *Bridson* only discloses sodium compounds and is silent with respect to lithium compounds. Accordingly,

claims 29 and its dependent 30, 34, 36-46, and 57-64 are allowable over *Bridson*. Applicants, therefore, respectfully request withdrawal of the rejection of claims 29-34, 36-46, and 57-64.

The Office Action rejects claims 52-54 and 69-71 under 35 U.S.C. §103(a) as being unpatentable over *Bridson* in view of *Barker*. Applicants respectfully traverse the rejection.

Claims 52-54 variously depend from claim 47, and incorporate all the elements of claim 47. Claim 47 recites, “an insertion compound of an alkali metal of formula LiM(XO₄) where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and M is a transition metal in a +2 oxidation state, wherein the insertion compound is present in the form of particles or grains, the particles exhibit a fully controlled homogeneous morphology, and a deviation from the mean value of the size of the particles is less than 20%.” *Bridson* fails to teach or suggest at least these elements of claim 47. *Barker* does not cure the deficiency of *Bridson*. *Barker* is also silent with respect to the above-recited elements of claim 47. Accordingly, claims 47 and its dependent claims 52-54 are allowable over the combined teaching of *Bridson* and *Barker*.

Claims 69-71 variously depend from claim 29, and incorporate all the elements of claim 29. Claim 29 recites, “a process for the preparation of an insertion compound of an alkali metal ... the insertion compound of an alkali metal of formula LiMXO₄, in which M is in the +2 oxidation state.” *Bridson* fails to teach or suggest at least these elements of claim 29. *Barker* does not cure the deficiency of *Bridson*. *Barker* is also silent with respect to the above-recited elements of claim 29. Accordingly, claims 29 and its dependent claims 69-71 are allowable over the combined teaching of *Bridson* and *Barker*.

Applicants, therefore, respectfully request withdrawal of the rejection of claims 52-54 and 69-71.

The Office Action rejects claims 56 and 75 under 35 U.S.C. §103(a) as being unpatentable over *Bridson* in view of *Barker*, and further in view of U.S. Patent No. 6,645,675 to Munshi (*Munshi*). Applicants respectfully traverse the rejection.

Claim 56 depends from claim 47, and incorporates all the elements of claim 47. As discussed, the combined teaching of *Bridson* and *Barker* fails to teach or suggest the above-recited element of claim 47, namely, “an insertion compound of an alkali metal of formula LiM(XO₄) where X is chosen from the group consisting of Si, S, Al, P, Ge, As and Mo, and M is a transition metal in a +2 oxidation state, wherein the insertion compound is present in the form of particles or grains, the particles exhibit a fully controlled homogeneous morphology, and a deviation from the mean value of the size of the particles is less than 20%.” *Munshi* does not cure the deficiency of *Bridson* and *Barker*. The Office Action only cites *Munshi* for disclosing “sodium electrolyte compounds useful in electrochromic device.” *Office Action*, page 18. *Munshi* is also silent with respect to the above-recited elements of claim 47. Accordingly, claim 47 and its dependent claim 56 are allowable over the combined teaching of *Bridson*, *Barker*, and *Munshi*.

Claim 75 depends from claim 29, and incorporates all the elements of claim 29. As discussed, the combined teaching of *Bridson* and *Barker* fails to teach or suggest the above-recited element of claim 29, namely, “a process for the preparation of an insertion compound of an alkali metal . . . the insertion compound of an alkali metal of formula LiMXO₄, in which M is in the +2 oxidation state.” *Munshi* does not cure the deficiency of *Bridson* and *Barker*. The Office Action only cites *Munshi* for disclosing “sodium electrolyte compounds useful in electrochromic device.” *Office Action*, page 18. *Munshi* is also silent with respect to the above-recited elements of claim 29. Accordingly, claim 29 and its dependent claim 75 are allowable over the combined teaching of *Bridson*, *Barker*, and *Munshi*.

Applicants, therefore, respectfully request withdrawal of the rejection of claims 56 and 75.

The Office Action rejects claims 60 and 61 under 35 U.S.C. §103(a) as being unpatentable over Barker. Applicants respectfully traverse the rejection.

Claims 60 and 61 indirectly depend from claim 29, and incorporate all the elements of claim 29. Claim 29 recites, “a process for the preparation of an insertion compound of an alkali metal . . . the insertion compound of an alkali metal of formula LiMXO₄, in which M is in the +2 oxidation state.” *Barker* fails to teach or suggest at least these elements of claim 29.

Accordingly, claim 29 and its dependent claims 60 and 61 are allowable over Barker. Applicants, therefore, respectfully request withdrawal of the rejection of claims 60 and 61.

The Office Action rejects claim 35 under 35 U.S.C. §103(a) as being unpatentable over *Barker* in view of U.S. Patent Application Publication No. 2004/0013943 to Stoker et al. (*Stoker*). The Office Action rejects claim 35 under 35 U.S.C. §103(a) as being unpatentable over *Bridson* in view of *Stoker*.

Claim 35 is canceled, so the rejection of claim 35 is moot. Applicants respectfully request withdrawal of the rejection of claim 35.

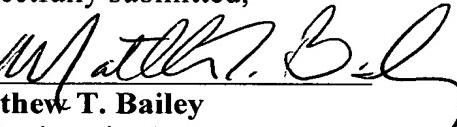
Furthermore, amended claim 29 recites, “a process for the preparation of an insertion compound of an alkali metal ... the insertion compound of an alkali metal of formula LiMXO₄, in which M is in the +2 oxidation state.” Claim 29 is allowable over the combined teaching of *Barker* and *Stoker* or *Bridson* and *Stoker*. As discussed, *Barker* and *Bridson* only disclose sodium compounds and are silent with respect to lithium compounds. *Stoker* does not cure the deficiency of *Barker* and *Bridson*, because one of ordinary skill would not have been motivated to combine the teaching of *Barker* and *Bridson* with that of *Stoker*. As the Supreme Court recently stated, “*there must be some articulated reasoning* with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int'l v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (emphasis added)). Here, the Office Action fails to provide articulated reasoning as why one of ordinary skill in the art would modify the processes disclosed in *Barker* and *Bridson* with teaching from *Stoker*. In fact, the Office Action merely makes a conclusive statement that “it would have been obvious to one of ordinary skill the art to modify the process of Barker [or Bridson] with the alkali salt in order to obtain lithium ion battery.” This statement alone, specially in a chemical case, is not sufficient to provide articulate reasoning.

The application is in condition for allowance and early, favorable action is respectfully solicited. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at (202) 496-7500 to discuss the steps necessary for placing the application in condition for allowance. All correspondence should continue to be sent to the below-listed address.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. §1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911.

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Respectfully submitted,

By 
Matthew T. Bailey
Registration No.: 33,829
McKENNA LONG & ALDRIDGE LLP
1900 K Street, N.W.
Washington, DC 20006
(202) 496-7500
Attorneys for Applicant